REMARKS

The Examiner is thanked for the due consideration given the application. This amendment is being filed concurrent with a request for continued examination.

Claims 1-35 are pending in the application. The claims (except claims 23, 29 and 32-35) have been amended to improve the language and to remove reference materials in a non-narrowing fashion. Claim 35 is newly presented.

No new matter is believed to be added to the application by this amendment.

The Specification

The amendment filed August 31, 2007 has been objected to as introducing new matter into the disclosure.

The Official Action asserts that claim 23 recites a limitation that is not supported by the original disclosure. However claim 23 has been amended to recited subject matter that is fully supported by the disclosure.

Support for amended claim 23 can be found in the specification at page 25, line 26 to page 26, line 4 (Figure 12):

> By means of the particularity of the geometry shown, according to which the chamber V1 is adjacent on one side to a disappearing chamber at point BM and on the other side to a chamber appearing at point BN, the chamber V1 is only isolated for a short instant when its volume is at its maximum and is therefore not varying. In the previous instant, the disappearing chamber was still communicating with the neighbouring

> discharge port 17 whilst the chamber V1 was communicating with the inlet port 16. In the next instant, the new chamber will communicate with the corresponding inlet port 16, whilst the chamber V1 will communicate with the discharge port 17.

Further support is found in the specification at page 31, lines 19 to 26:

> In any case, a chamber appears when the front sides of the lobes of the outer profile pass through the osculating contact, at the intersection BN of the curves of action situated above the axis Ox containing the point R. It passes through its maximum after a rotation of just over a half-revolution. The chamber is then on the opposite side to the rolling point relative to the pivots. The closing of the chamber is symmetrical with its opening, and the "lifetime" of the chamber is a little greater than one revolution.

Also at page 35, lines 1 to 8:

> The invention is compatible with the Moineau principle by which, as described in US-A-1 892 217, the helical shape of the two profiled members extends over sufficient pitches so that no cavity opens simultaneously at the two axial ends of the machine. Due to the accuracy and quality of the geometry according to the invention, it is possible to limit the total angular displacement between the profiles at the two ends of the machine to a value hardly greater than the lifetime of the chamber in each plane perpendicular to the axes."

It is accordingly respectfully requested that this objection be withdrawn.

Rejection of Claim 23 Under 35 USC §112, First Paragraph

Claim 23 has been rejected under 35 USC §112, first paragraph as failing to comply with the enablement requirement. This rejection is respectfully traversed.

Amended claim 23 is supported by the original disclosure, especially page 25, line 26 to page 26 line 4 of the specification, which disclose simultaneous opening and closing of chambers.

A chamber is first opened at one axial end of the machine, then it is isolated for a short instant from both axial ends of the machine, and finally is opened to the opposite axial end of the machine. No chamber opens simultaneously at the two axial ends of the machine.

It confirms that the invention is compatible with the *Moineau* principle, especially in the embodiment described Figure 14, and at page 27, line 15 to page 28, line 8 of the specification.

Amended claim 23 thus contains subject matter described in the specification in such a way to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention without undue experimentation.

This rejection is believed to be overcome, and withdrawal thereof is respectfully rquested.

Rejection of Claims 32-34 Under 35 USC §112, First Paragraph

Claims 32-34 have been rejected under 35 USC §112, first paragraph as failing to comply with the enablement requirement. This rejection is respectfully traversed.

In accordance with the comments in the Official Action, original claims 32-34, i.e., amended/new claims 32-35, describe

the system shown in Figures 28A-29F. This system is disclosed in the specification from page 33, line 22 to page 34, line 7. The specification at page 33, lines 29-31, reads: "the profiles 63 and 64 form a machine in the first class according to the invention and the profiles 73 and 74, a machine in the second class according to the invention."

The inlet and outlet of machines in the first class and in the second class have been disclosed in the specification:

Figure 4F and page 16, lines 7-11: "The chambers in the growth phase communicate with the port 8, which extends to the rear point of contact C4 of the chamber V4. The chambers in the shrinkage phase communicate with the discharge port 9, which starts from the front point of contact C5 of the chamber V4."

Figure 12 and page 25, line 15 to page 26, line 4:

> These ports 16, depending on whether or not they are covered by the m-lobed profiled member, selectively make the chambers communicate with the intake. In the other flange, located at the axial extremity hidden from the observer in figure 12, there are ports 17 that are symmetrical with the ports 16 relative to radii passing through the lobe vertices of the (m-1)-lobed profile 4, and the angular tip of which coincides with the connection between the two arcs forming the (m-1)-lobed profile 4 on the front side of each lobe. The ports 17 communicate with the hydraulic discharge of the machine. (broken-off quotation)

Figure 12A, page 26, lines 5-14:

> Figure 12A shows that instead of or in addition to the ports 16 and 17, inlet channels 18 and discharge channels 19 can also be provided in the (m-1)-lobed profiled member, opening through the respective sides of the lobes of the outer profile 4, approximately at

the connections between the two arcs forming the profile 4 so that they are closed when the profiles are in osculating contact and are then progressively opened by the chamber forming between the two contacts resulting from the disintegration of the osculating contact, in the case of the appearance of a chamber for the intake, or are progressively closed with regard to the discharge, in the case of the disappearance of a chamber.

Figure 13, page 26, line 15 to page 27, line 14:

The situation shown in figure 13 corresponds approximately to the situation in figure 2A. Looking at figure 2D, it can be seen that the chamber V4, the rear edge of which has already passed bifurcation point BM and would consequently already be communicating with the discharge port in a distribution system according to figure 12, has still not reached point BN and would therefore still be communicating with the inlet port of such a distribution system, which is moreover necessary as the volume of the chamber V4 is still growing. (broken-off quotation)

Figure 14, page 27, lines 21-29:

The angular displacement between the profiles of the two extremities is such that in the situation shown, where the chamber V5 on the intake side is reaching the bifurcation point BN, the rear edge of this chamber, which itself has a helical appearance, has just left the other osculation at the other bifurcation point BM. The situation that was obtained by a profile in a single plane in the cases of figures 11B and 12 is therefore restored by means of helicity, namely that the same cavity is adjacent to an appearing cavity at its front edge and a disappearing cavity at its rear edge.

Figure 15, page 28 lines 19 to 22 and page 29, lines 1 to 7:

"In the area in which the profiles 3 and 4 are formed, the profiled members 1 and 2 are installed between two flanges 28, 29

through which the inlet ports 16 and discharge ports 17 are respectively formed."

> The inner space contained between the end wall 31 of the housing on the one hand and the flange 28 and the corresponding surface of the profiled member 1 on the other hand is formed into a chamber subject to the inlet pressure. Similarly, a chamber subject to the discharge pressure is formed between the other end wall 32 of the housing on the [one] hand and the other flange 29 and the other end surface of the profiled inner member 1 on the other hand.

The system shown in Figures 28A-29F is composed of one machine in the first class and one machine in the second class. Both machines in the first class and in the second class has an inlet on one side, and an outlet on the opposite side. These inlet and outlet can be realized by disclosed means, including charge/discharge ports and/or inlet channels and discharge channels.

Inlet and outlet of machines in the first class and in the second class is described in the specification in such a way to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use these machines and so to use system shown in Figures 28A-29F.

Regarding the question at paragraph 20 of the Official Action, it is clear to a person having ordinary skill in the art at the time of the invention was made to have different outlet and inlet ports for the interior and the exterior chamber, or a common inlet port and a common outlet port, depending on the

application. This type of machines is well known by the one skilled in the art since a long time (see for example MOINEAU US1892217), but can be developed with very different geometry such as semi-circles, hypocycloids, epicycloids, epitrochoids, etc.

This rejection is believed to be overcome, and withdrawal thereof is respectfully requested.

Rejection of Claim 34 under 35 USC §112, Second Paragraph

Claim 34 has been rejected under 35 USC §112, second paragraph as being indefinite. This rejection is respectfully traversed.

The Official Action asserts that claim 34 contradicts claim 32, upon which it depends. However, claim 34 has been amended to depend upon new claim 35, which was presented in conformance with the comments in the Official Action. Claim 34 is thus clear, definite and has full antecedent basis.

This rejection is believed to be overcome, and withdrawal thereof is respectfully requested.

Rejection of Claim 29 under 35 USC §112, Second Paragraph

Claim 29 has been rejected under 35 USC §112, second paragraph as being indefinite. This rejection is respectfully traversed.

The Official Action asks what applicant means by the ports are connected angularly to the profile outer member. It is

disclosed in the specification, especially of Fig 15 and page 28, lines 6-14:

> It is considered that there is a flange against each radial surface of the profiled members 1 and 2 laterally closing the chambers, with the exception of the ports that will be described. These flanges are firmly rotatably attached to the outer profile 2. In the flange located on the side of the observer in figure 12, teardrop- or comma-shaped ports 16, the angular tip of which coincides with the connection of the two arcs forming the outer profile, on the rear side of the lobes, have been formed through the flange (the flange itself is not shown).

Nevertheless the Official Action seems to consider that claim 29 is unclear. However, claim 29 has been amended to be clear, definite and have full antecedent basis.

This rejection is believed to be overcome, and withdrawal thereof is respectfully requested.

ART REJECTIONS

None of the cited documents do disclose, nor suggest a contact position located on the common tangent to the pitch circles, and at which both contacting points have a common center of continuous curvature located on the pitch point of the pitch circles.

Rejection Over TAYLOR et al.

Claims 1, 15 and 17-22 have been rejected under 35 USC §102(b) as being anticipated by TAYLOR et al (hereinafter TAYLOR). (GB 1,002,642). This rejection is respectfully traversed.

First, in paragraph 24 of the Official Action it is asserted that it can be seen on a drawing if a curvature is continuous or not. It consequently seems that the Official Action may be confused by the difference between a continuous curvature and a line forming no sharp angle.

This is not the same. The Official Action refers to the first derivate of the function mathematically describing the line, whereas the curvature is mathematically the second derivate of the function. The first derivate represents the slope of the line. If there is a sharp angle in the line, the slope abruptly changes. Accordingly the first derivate is discontinuous at such a point. Admittedly, the second derivate is then also discontinuous at such a point. But the second derivate can also be discontinuous at other points, i.e., points forming no angle.

The curvature (second derivate) is directly connected to the position of the center of curvature of the curve at the point considered. The curvature is discontinuous between two adjacent points if there is a distance between the centers of curvature associated with these two points, respectively.

Accordingly, contrary to the opinion expressed in paragraph 24 of the Official Action, a line can have a discontinuous curvature at one point even if the line exhibits no sharp angle at this point. This especially happens at a point where the line changes from convex to concave because at such point, the center "jumps" from one side of the line to the other side of the line.

This is also especially the case at a point where two arcs of circle are connected to each other, because at such a point the center of curvature "jumps" from the center of one of the circles to the center of the other circle.

To illustrate the argument, one can refer to:

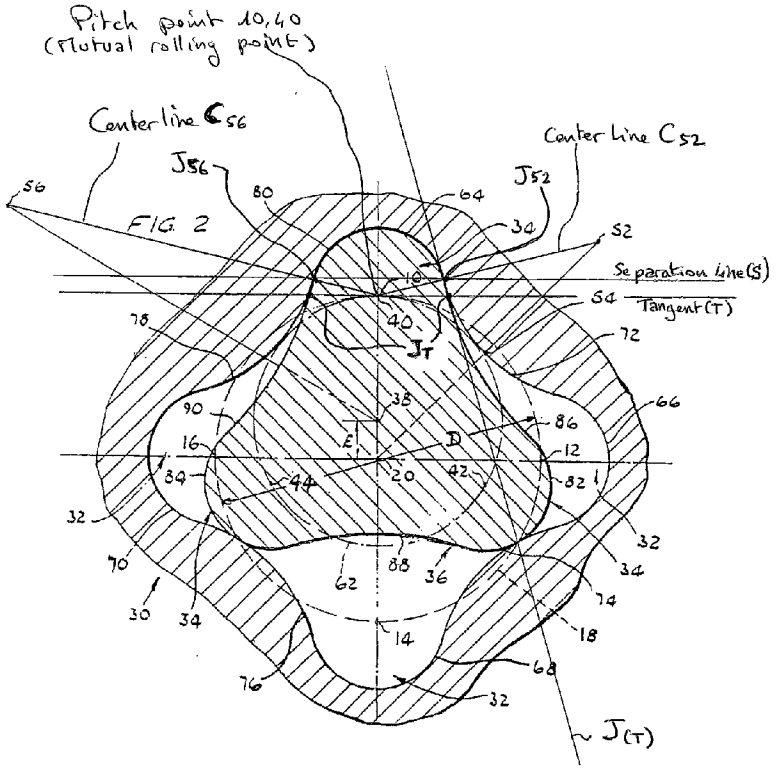
- Curve- http://mathworld.wolfram.com/Curve.html
- Curvature- http://mathworld.wolfram.com/Curvature.html

In paragraph 23 of the Official Action, relating to TAYLOR's Fig 2, it is deemed that claim 1 does not recite that "the radius of curvature of both contact surfaces at the contact position be equal to the distance between the contact position and the rolling point". But this is a mere consequence of the still more precise feature of claim 1 : "the profiled members have at said point of contact equal continuous curvatures in the same direction with said rolling point as their common centre."(Underline added).

If their common center is the rolling point, their radius of curvature is necessarily equal to the distance between the contact point and the rolling point.

Paragraph 23 of the Official Action assets that TAYLOR's Figure 2 shows a contact position on the common tangent (T) to both pitch circles at the pitch point 10, 40. This is however not true, in view of the following analysis, which admittedly goes beyond what has been explained in the response to the first

Official Action. A reproduction of TAYLOR's Figure 2 is inserted, at an enlarged scale, and with some elements added:



~ Tangent (T) to both pitch circles at the pitch point;

~ Points JT where tangent (T) intersects the profile of the inner member;

~ Tangent (TJ) to the profile at one of points JT;

~ Centerline C52 interconnecting centers 52 and 10 of the arc portions 72 and 64, respectively, of the profile of the outer member 30;

~ Point J52 where line C52 intersects the profile of the outer member 30;

˜ Centerline C56 interconnecting centers 56 and 10 of the arc portions 90 and 80, respectively, of the profile of the inner member 36;

˜ Point J56 where line C56 intersects the profile of the inner member 36;

˜ Separation line (S) interconnecting intersections J52 and J56.

According to page 4, lines 23 to 41, TAYLOR's profiles are made of part-circular arcs which are connected together at points where they have a common tangent.

Referring to Figure 2, such points where the arcs of a profile connect together cannot be elsewhere than at the intersection between the profile and the centerline connecting the two centers. This corresponds, in TAYLOR's Figure 2 as supplemented by us, to points J52 for the profile of the outer member and J56 for the profile of the inner member. At any other profile point than at such intersections with the centerlines, the radii from both centers to the profile point would not be aligned and thus a common tangent would be impossible. Furthermore, the applicant's analysis is corroborated by the fact that centerlines C52 and C56 intersect the profiles substantially perpendicularly to the profiles (at least as can be seen).

In fact, there is of course both one point J52 and one point J56 on either side of the vertical axis of the drawing but we did not represent it for better readability of the drawing.

The profiles of both members coincide with each other above separation line (S) because they are circles having the same center 10, 40 and the same radius.

But the profiles diverge below separation line (S), because they follow different circles having different centers and different radii.

Therefore, at the points JT (applicant's marking) considered by the Official Action, TAYLOR's profiles have already diverged and there is no contact point. This is because points JT are clearly below the separation line S.

Furthermore, even if there were a contact (which applicant does not admit), the profiles could not be centered at the pitch point 10, 40 because the tangent T(J) to the profiles is clearly not perpendicular to the tangent (T) connecting the alleged contact point JT to the pitch point 10, 40.

Still further, even if one person considered to modify TAYLOR for extending the lobe arcs 64, 84 to 180° so that points J52, J56 coincide with point JT, that one person would be obliged to create a discontinuous curvature at such a point, i.e. a change from a curvature centered on the pitch point to a rectilinear portion (infinite curvature) or to a curvature centered outside the profiles. Otherwise, the profile of the outer member would form a neck through which the lobe of the inner member could not be extracted. In other words the lobe of

the inner member would be captive behind the so formed neck and further rotation of the members would be impossible.

Therefore, TAYLOR does neither disclose, nor suggest, the claimed feature of a contact position lying on the common tangent to the pitch circles and being formed between two profile points having a same continuous curvature centered on the pitch point.

Regarding anticipation, it is noted that the Official Action only relies upon TAYLOR's embodiment of Figure 2. It has been shown hereinabove that at the points where the profiles cross the common tangent to the pitch circles, the centers of curvatures of the profiles are outside the profiles (centers 52, 56 in TAYLOR's Figure 2). Furthermore, the curvatures are different, and the profiles are perhaps very close to each other, but not in contact with each other. Any contrary impression is due to the thick lines and the small scale of the drawings.

Even if, contrary to applicant's belief, the Official Action maintains that the profiles cross the tangent T at a contact position, there would remain that the profiles curvatures are described neither as continuous at such a position, nor as centered on the pitch point at that point (tangent T(J) is not vertical in marked-up Figure 2), nor as identical at that point.

Therefore the unique meshing defined in claim 1 is not disclosed by TAYLOR.

TAYLOR Thus fails to disclose each and every element of claim 1 of the present invention. TAYLOR thus fails to

anticipate claim 1 of the present invention. Claims depending upon claim 1 are patentable over TAYLOR for at least the above reasons.

This rejections is believed to be overcome, and withdrawal thereof is respectfully requested.

Rejection Over TAYLOR and MORITA

Claim 16 have been rejected under 35 USC §103(a) as being unpatentable over TAYLOR in view of MORITA (U.S. Patent 5,114,325). This rejection is respectfully traversed.

The deficiencies of TAYLOR in regards to claim 1 have been discussed above. MORITA fails to address these deficiencies, and claim 16 is patentable over TAYLOR and MORITA at least by its dependence on claim 1.

Further, MORITA does not disclose a contact position located on the common tangent to the pitch circles and in which both contact points have a same continuous curvature centered on the pitch point of the pitch circles.

Therefore, TAYLOR and MORITA exhibit the same shortcomings with respect to claim 16, and their combination fails to suggest claim 16. A *prima facie* case of unpatentability has thus not been made.

This rejection is believed to be overcome, and withdrawal thereof is respectfully requested.

Rejection Over TAYLOR and BUCHMULLER et al.

Claims 24 and 25 have been rejected under 35 USC §103(a) as being unpatentable over TAYLOR in view of BUCHMULLER et al. (hereinafter BUCHMULLER)(U.S. Patent 5,674,060). This rejection is respectfully traversed.

The deficiencies of TAYLOR in regards to claim 1 have been discussed above. BUCHMULLER fails to address these deficiencies, and claims 24 and 25 are patentable over TAYLOR and BUCHMULLER at least by their dependence on claim 1.

Further, BUCHMULLER fails to disclose a contact position located on the common tangent to the pitch circles and in which both contact points have a same continuous curvature centered on the pitch point of the pitch circles.

Therefore, TAYLOR and BUCHMULLER exhibit the same shortcomings with respect to claims 24-25, and even their combination can neither anticipate nor suggest base claim 1. A *prima facie* case of unpatentability has thus not been made.

This rejection is believed to be overcome, and withdrawal thereof is respectfully requested.

Rejection Over TAYLOR and BRUNDAGE

Claims 24 and 26-30 have been rejected under 35 USC §103(a) as being unpatentable over TAYLOR in view of BRUNDAGE (U.S. Patent 3,695,791). This rejection is respectfully traversed.

The deficiencies of TAYLOR in regards to claim 1 have been discussed above. BRUNDAGE fails to address these deficiencies,

and claims 24 and 26-30 are patentable over TAYLOR and BRUNDAGE at least by their dependence on claim 1.

Further, BRUNDAGE does not disclose a contact position located on the common tangent to the pitch circles and in which both contact points have a same continuous curvature centered on the pitch point of the pitch circles.

Therefore, TAYLOR and BRUNDAGE exhibit the same shortcomings with respect to claims 24 and 26-30, and even their combination can neither anticipate nor suggest claim 24 and 26-30. A *prima facie* case of unpatentability has thus not been made.

This rejection is believed to be overcome, and withdrawal thereof is respectfully requested.

Rejection Over TAYLOR and Legal Precedent

Claim 28 has been rejected under 35 USC §103(a) as being unpatentable over TAYLOR in view of Legal Precedent. This rejection is respectfully traversed.

The deficiencies of TAYLOR in regards to claim 1 have been discussed above. Legal Precedent fails to address these deficiencies, and claim 28 is patentable over TAYLOR and BRUNDAGE at least by their dependence on claim 1.

Also, Legal Precedent fails to disclose or infer a contact position located on the common tangent to the pitch circles and in which both contact points have a same continuous curvature centered on the pitch point of the pitch circles.

Therefore, claim 28 is patentable over TAYLOR in view of Legal Precedent. A *prima facie* case of unpatentability has thus not been made.

This rejection is believed to be overcome, and withdrawal thereof is respectfully requested.

Rejection Over GRAY, BONAVERA and WANKEL

Claims 1, 32 and 33 have been rejected under 35 USC §103(a) as being unpatentable over GRAY (U.S. Patent 3,884,600) in view of BONAVERA (U.S. Patent 3,117,561) and WANKEL (U.S. Patent 2,988,008). This rejection is respectfully traversed.

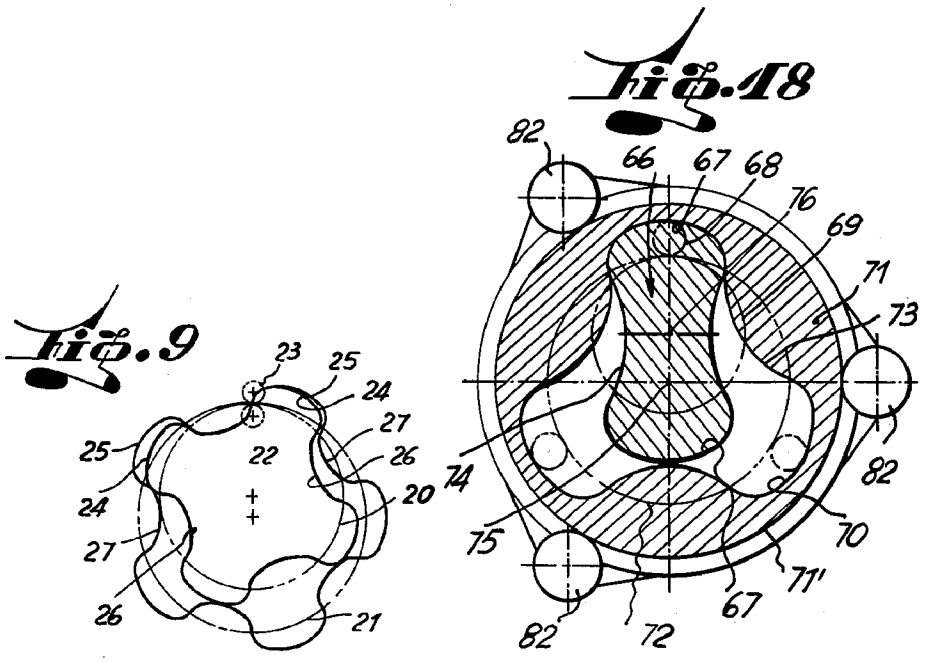
GRAY is cited as disclosing a profiled member having an outer profile and an inner profile for cooperating with two other profiled members, for forming two machines, one with the outer member having one more lobe, the other with the inner member having one more lobe.

BONAVERA is cited as, according to the Official Action, disclosing the particular meshing of the invention for a machine whose outer member has one more lobe.

BONAVERA is cited as, according to the Official Action, disclosing the particular meshing of the invention for a machine whose inner member has one more lobe.

However, neither BONAVERA nor WANKEL show a contact position located on the common tangent to the pitch circles and in which both contact points have an identical continuous curvature centered on the pitch point of the pitch circle.

Figures 9 and 18 of BONAVERA are reproduced below.



In paragraph 25 the Official Action asserts that "identical curvatures" are not claimed, but they are as has been discussed above. Figure 18 of BONAVERA has profiles generated in, e.g., Figure 9. The profile of each member is the locus of a point of a circle 23 rolling on the respective pitch circle 20 or 21. The radius of the circle 23 rolling on both pitch circles is the same; otherwise the pitch of both members would be different. However, since the pitch circle 21 of the outer member has a greater radius than the pitch circle 20 of the inner member, the concave portions of the profile of the outer member are necessarily somewhat wider than the convex portions (lobes) of the profile of the inner member. Consequently, in the situation seen in figure 18, there is only one possible contact point which is located at the apex of the lobe. Any other contact point of

the lobe considered is geometrically impossible. Any contrary appearance is due to the small scale and thick lines of the drawings.

However, the sole contact point is clearly outside the common tangent to the pitch circles.

This clearly shows that BONAVERA's Figure 18 fails to read on the present invention.

Regarding WANKEL, the Official Action's comments on the dimension of the contact in the third dimension are not relevant since the discussion, and claim 1 refers to profiles.

Regarding the effect of wear which could modify a sharp edge into something else, of course the result will be a small curve with a very small radius of curvature because the sharp edge would wear all along its travel along the profile of the outer member. A look at Figure 2 shows that the three edges 5 are under very different "inclinations" with respect to the opposing profile. Along one revolution, each "sharp edge" 5 travels through the three shown situations, and many others. There is no reason why the edge would match the curvature of the profile of the outer member at the very position where the sharp edge crosses the common tangent to the pitch circles, and would not match the curvature of the profile of the outer member at any other position. In fact, the sharp edge will become a very small radius of curvature.

This shows that even if wear is taken into consideration, WANKEL fails to teach the particular contact conditions defined in claim 1 of the application. WANKEL neither teaches the equal curvatures, nor the continuous curvatures.

Since the Official Action relevantly admits that Gray also fails to disclose such contact position, the combination of references fails to induce one of ordinary skill to produce a claimed embodiment of the present invention. A *prima facie* case of unpatentability has thus not been made.

This rejection is believed to be overcome, and withdrawal thereof is respectfully requested.

Rejection Over BRODOV et al. WANKEL and BONAVERA

Claims 1 and 34 have been rejected under 35 USC §103(a) as being unpatentable over BRODOV et al. (hereinafter BRODOV) (RU 2140018) in view of WANKEL and BONAVERA. This rejection is respectfully traversed.

This rejection is similar to that based on GRAY in view of BONAVERA and WANKEL, and fails to render claim 1 obvious, for similar reasons.

All three cited patents (BRODOV, WANKEL and BONAVERA) fail to disclose the peculiar contact position defined in claim 1 of the present invention. Accordingly, claim 1 is non-obvious over BRODOV in view of WANKEL and in view of BONVERA.

Claims 34 and 35 replace old claim 34. Since claim 34 and 35 depend on claim 1, the combination of references which fails to

render claim 1 unpatentable also fails, at least for the same reasons, to render claims 34-35 unpatentable.

This rejection is believed to be overcome, and withdrawal thereof is respectfully requested.

MISCELLANEOUS

For Examiner's information, some Internet links are given below:

http://mathworld.wolfram.com/OsculatingCurves.html,

http://en.wikipedia.org/wiki/Osculating_curve,

http://mathworld.wolfram.com/Curvature.html,

http://en.wikipedia.org/wiki/Curvature,

http://mathworld.wolfram.com/OsculatingCircle.html,

http://en.wikipedia.org/wiki/Osculating_circle

CONCLUSION

The objections or rejections are believed to be overcome, obviated or rendered moot and no issues remain. The Examiner is accordingly respectfully requested to place the application in condition for allowance and issue a Notice of Allowability.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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